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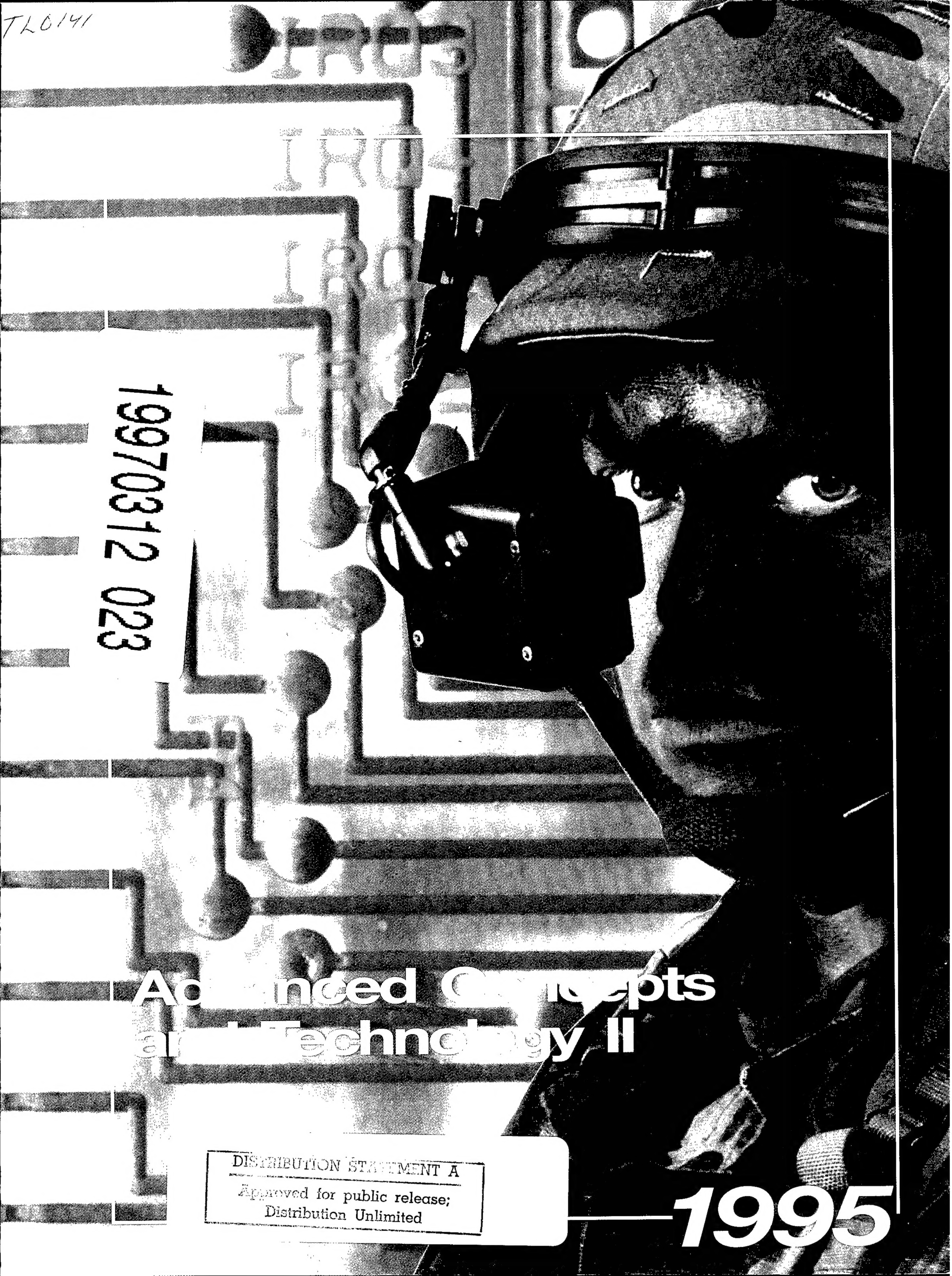

Advanced Concepts and Technology II

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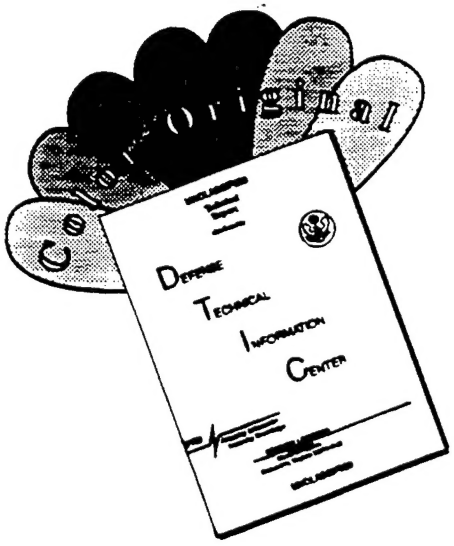

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The Army today has brought together a unique team to define the technologies that will shape the smaller, Force Projection Army of the 21st century.

This team is comprised of the Army's Training and Doctrine Command Battle Labs; the Louisiana Maneuvers Task Force, and the Army's Research, Development, and Acquisition Community. Together, they're helping define the technology that will lead the Army to its Force XXI vision.

The Army's Advanced Concepts and Technology II (ACT II) Program enables direct industry involvement in this process. ACT II supports Battle Lab experiments through competitive funding of industry's most advanced technologies, prototypes, and non-developmental items. Ultimately, the Army selects proposals that demonstrate the greatest potential to fulfill warfighting capability requirements.

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The Army of the future faces the challenges of an uncertain political landscape against a backdrop of rapid technology growth. To explore the possibilities of the future while maintaining its warfighting strengths, the Army today has brought together a unique team to define the technologies that will shape the smaller, Force Projection Army of the 21st Century.

This team is comprised of the Army's Training and Doctrine Command Battle Labs; the Louisiana Maneuvers Task Force; and the Army's Research, Development, and Acquisition Community. Together, they're helping define the technology that will lead the Army to its Force XXI Vision.

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In 1994, its inaugural year, ACT II funded a total of 28 projects. In 1995, we are pleased to announce that 35 projects have been selected for funding. This brochure provides a description of the winning proposals from the 1995 competition and highlights the achievements of selected 1994 projects.

ACT II is sponsored by the Army Chief of Staff and the Office of the Assistant Secretary of the Army (Research, Development, and Acquisition). The U.S. Army Training and Doctrine Command (TRADOC), the Army Materiel Command (AMC), and the Army Research Office (ARO) collaborate to build ACT II partnerships between the Army, industry, and the academic community.

Together, we invite you to join the Army's technology team and help us chart a course for the Army of the 21st Century. We look forward to your support and participation in the future.

Gerald J. Iafrate

Dr. Gerald J. Iafrate
Director, U.S. Army Research Office

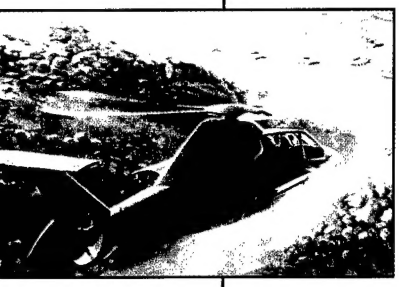
The ACT II Program

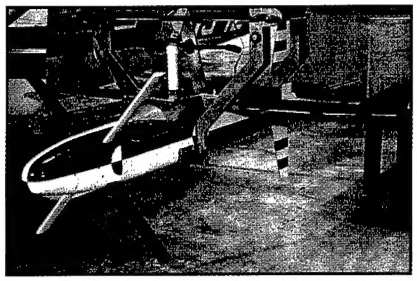
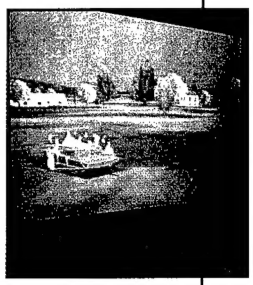
The ACT II Program encourages the application of mature technologies to specific Army mission needs. ACT II funds proposed technology demonstrations which may be selected for expedited acquisition or funded through the Army R&D programs.

ACT II projects are funded at a maximum of $1.5 million with a planned period of performance not exceeding 12 months. The program focuses on applying mature technologies and unconventional concepts and approaches to address specific Army needs. This approach is intended to shorten the acquisition cycle and reduce the development costs.

Louisiana Maneuvers

The Army Chief of Staff created the Louisiana Maneuvers Task Force (LAM-TF) to energize and guide the restructuring of the Army into the 21st Century while maintaining combat readiness for any contingency. The LAM-TF uses virtual and live simulations to practice roles and missions, develop and explore options, assess and direct progress, and provide a framework for decisions by senior leaders.



TRADOC Battle Labs

TRADOC Battle Labs provide an environment with soldiers, units, and real scenarios to experiment in the areas of greatest change on the battlefield. Battle Labs are organized around battlefield dynamics as listed below.

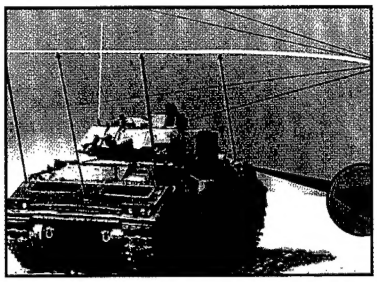
Battle Command Battle Lab, Fort Leavenworth, KS; Fort Gordon, GA; and Fort Huachuca, AZ; seeks to develop solutions to battle command dynamics in doctrine, training, leadership, organization, materiel, and soldier enhancements. The focus is to provide timely, relevant, and accurate information to commanders and their battle staff without tethering the commander to a fixed location on the battlefield.

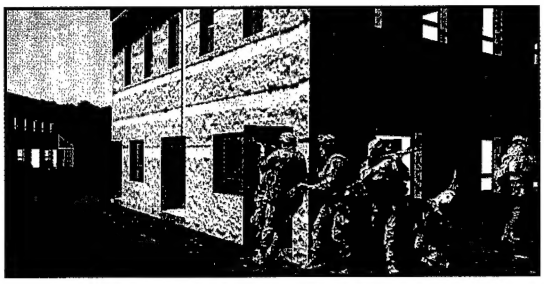
Combat Service Support Battle Lab, Fort Lee, VA, seeks to effectively integrate materiel and distribution management into a seamless distribution system—from factory to foxhole. This Battle Lab is particularly interested in enhancing the supportability of the force by achieving total asset visibility and

in-transit visibility, reducing expenditure rates and tonnage requirements for shipping, and retaining and improving the ability of the force to conduct operations to completion.

Depth and Simultaneous Attack Battle Lab, Fort Sill, OK, is responsible for integrating all activities related to conducting simultaneous attacks in all three dimensions against an enemy throughout the depth of the battlefield. Its focus is to detect and identify enemy forces, convey the information in near real-time from sensors to engagement systems, and conduct unilateral and joint precision strikes with destructive and disruptive fire.

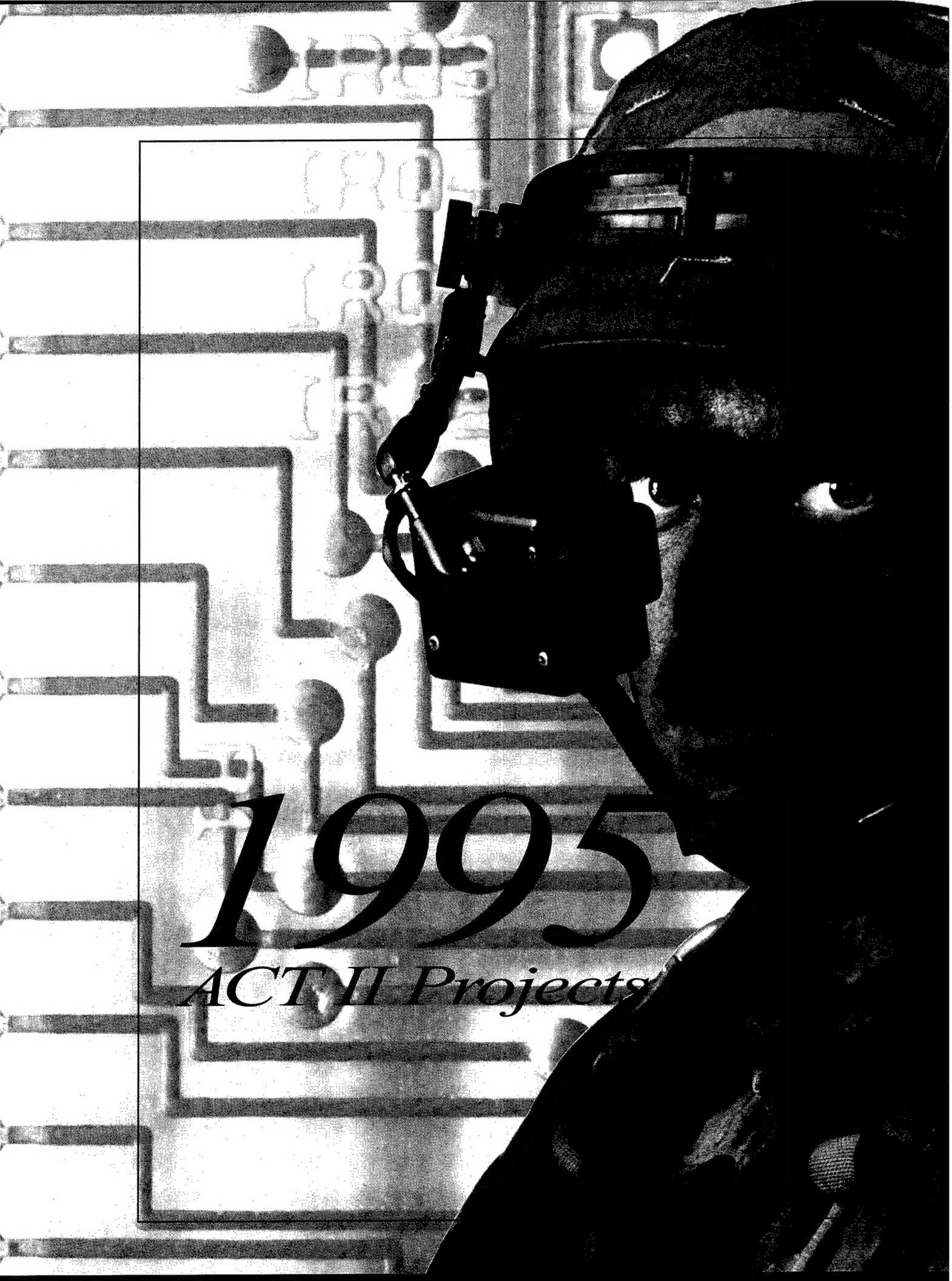
Dismounted Battlespace Battle Lab, Fort Benning, GA, is responsible for integrating the modernization of Army forces operating in the dismounted battlespace and in Operations Other Than War (OOTW). Operations include the deployment and employment of brigade and below task forces, which are generally employed within the context of early entry operation. The generation of overmatching combat power in a dismounted battlespace is essential to defeat enemy forces during combat and to rapidly accomplish the mission required during OOTW.





Early Entry Lethality and Survivability Battle Lab, Fort Monroe, VA, focuses on the initial operations of deploying forces to gain a foothold within a contingency theater of operations. The deployed force conducts decisive operations or sets the stage for the arrival of following forces. Early Entry operations are inherently joint, often require coalitions with friendly nations, and cover the full spectrum of conflict including OOTW.

Mounted Battlespace Battle Lab, Fort Knox, KY, is responsible for providing overall direction, oversight, and horizontal integration for the total Mounted Battle Space dynamic arena. This encompasses all related combat and force development efforts required for decisive maneuvers and to overmatch enemies in engagement range by optimizing situational awareness, digitized information flow, and survivability of mounted forces.


1995
ACT II Projects

Increased Data Transmission

A new waveform provides four times the data bandwidth while using the same 25 kHz channel spacing currently employed by standard VHF/UHF communications. The waveform will be designed for eventual integration into future multi-band, multi-mode tactical radios.

The waveform will be compatible with the non-coherent signaling that is widely used in the 16 kbps SINCGARS radio and will be similar to the waveform defined in the Data Control Waveform Interoperability Specification. Systems testing of modified government inventory hardware will provide two proof-of-concepts systems for further operational field testing.

The new waveform will improve digital radio architecture with increased data rates and may use less power over longer ranges. This technology will make high-speed transmission of video images feasible over standard channels thus enhancing the digitized battlefield and improving battle management. (95BCBL-011)

Harris Corporation, Mr. Tom Kenney, (716) 242-3579

Battle Command BL, Mr. Monroe Timmons, (706) 791-8330

U.S. Army Communications-Electronics Command, Mr. Francis L. Schurogot, Jr., (908) 427-2793

Wideband Data Networking

A secure mobile communications network which provides data links between remote sensors and standoff weapons platforms is a critical component of the digitized battlefield.

This effort will demonstrate a wireless network using off-the-shelf Secure Packet Radios. Network features will include embedded security, intelligent data links, high throughput, adaptive routing, automatic range extension, and mobile nodes.

Wideband networking will aid the Battle Command Battle Lab in evaluating candidate approaches and providing practical solutions for mobile, interoperable, wide band communications capabilities to digitize the battlefield and win the information war. Potential applications include combat service support, telemedicine, and disaster relief operations. (95BCBL-112)

Hazeltine Corporation, Ms. Donna Link-Klein, (516) 262-8097

Battle Command BL, Mr. Song Chon, (706) 791-8331

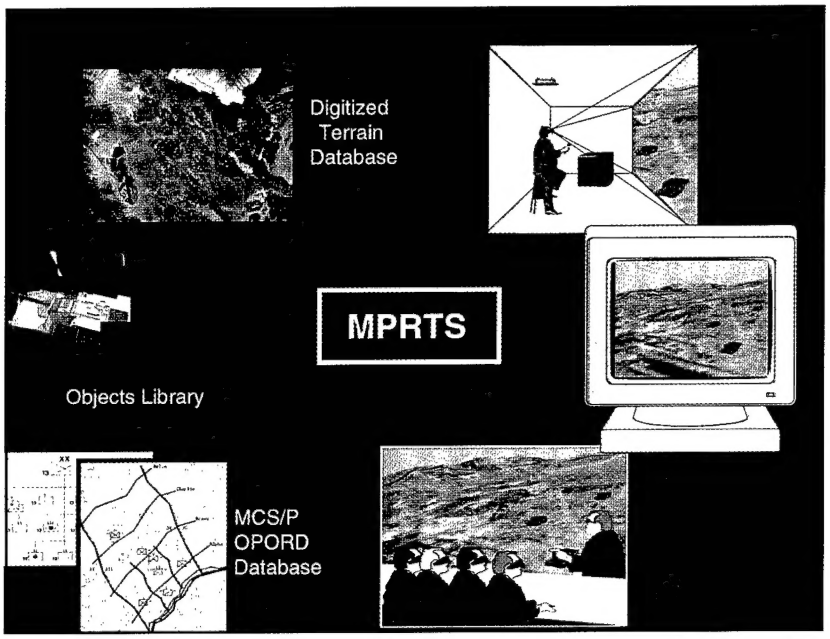
U.S. Army Communications-Electronics Command, Ms. Carol Riley, (908) 532-3473

Mission Planning and Rehearsal

The Mission Planning Rehearsal and Training System (MPRTS) integrates existing mature technologies in an interactive virtual environment that will allow Army mission plans to be rehearsed over a three-dimensional (3-D) view of the same terrain on which the battle is planned.

The system incorporates commercial software and hardware with a terrain database, a virtual object library and an operation plans database. The system can be used by an individual soldier using active 3-D glasses or by a group using a projection screen and passive glasses.

MPRTS focuses on rapid deployment and the Army's need to reduce training costs and provide realistic training in mission planning for leaders and battle staffs. MPRTS will be a 21st Century "sand table" to help the Army meet the challenge to "maintain the edge with quality soldiers (active and reserves) who are trained to razor sharpness." (95BCBL-079)



Research Triangle Institute (RTI), Dr. Geoffrey A. Frank, (919) 541-6629

Battle Command BL, LTC John Collier, (913) 684-2358

U.S. Army Simulation, Training, and Instrumentation Command, Mr. Wesley A. Milks, (407) 381-8789

Digital Tactical Communications

This program integrates commercial and government off-the-shelf equipment to provide digital video, audio, and data communications enhancements for soldiers over existing tactical communications systems.

The effort demonstrates real-time, bi-directional audio, video and data communications using the Mobile Subscriber Equipment (MSE) network. Data and video compression technology will be used to overcome the relatively low data rate of MSE equipment.

The concept provides a force multiplier by bringing expert capability to the digitized battlefield, especially among field hospitals, medics, CONUS hospitals, battlefield commanders, logistics support personnel, supply depots and maintenance personnel. The concept provides improved communications and information sharing to enable unified action, and rapid application of resources (allows an "expert" located anywhere to communicate with an "assistant") at the point of action. (95CSS-034)

Delta Information Systems, Mr. Charles Ziegler, (215) 657-5270

Battle Command BL, MAJ William Teece, (706) 791-3609

U.S. Army Communications-Electronics Command, Mr. James Chon, (908) 427-3442

Battle Command Decision Support: Phoenix

Phoenix provides the combat developer with a testbed for determining and demonstrating relevant tools for the Army commander and his staff to plan and execute combat operations at various levels of intensity and in operations other-than-war, in both a static situation and on-the-move.

Phoenix integrates into the Battle Command Battle Lab lessons learned and Command and Control concepts and accomplishments from Team Battle Focus. Included are PEO Aviation, PEO Armored Systems Modernization, Team Monmouth, PEO IEW, PM ADCCS and others who need a C2 Tactical Operations Center.

By leveraging the current Battle Command Decision Support System through prototyping within the Army's Digitization Testbed, the system provides a warfighting commander a relevant display and analytical tools in near real-time. (95BCBL-170)

Mystech Associates Incorporated, Mr. John McGlone, (703) 671-8680

Battle Command BL, MAJ George Kather, (913) 684-2367

U.S. Army Communications-Electronics Command, Mr. Daniel McClintock, (908) 532-3473

Multimedia on the Battlefield

Demonstrates the ability to employ Asynchronous Transfer Mode (ATM) switches in a tactical environment to provide multimedia services in near real-time on the digitized battlefield.

An ATM switch will be installed at Fort Gordon to provide connectivity into the Secure Survivable Communication Network. This effort will develop scenarios and conduct testing to interconnect existing networks via ATM and interconnect ATM switches via tactical radios using switched virtual circuits at the Joint Warfighter Interoperability Demonstration, 1995.

ATM provides substantial improvement by allocating each user sufficient assets for each call/service. Implementation of ATM in a tactical environment will provide for strategic connections into a CONUS-based broadband network. This provides the tactical commander necessary information, regardless of where that information might be located within the global grid. (95BCBL-142)

GTE Government Services Corporation, Mr. Richard Larkin, (508) 880-4843

Battle Command BL, Mr. Ricardo Torres, (706) 791-5181

U.S. Army Communications-Electronics Command, Mr. Tadd Adams, (908) 532-4332

Voice Activated Commands

Demonstrates a command and control application whose key functions can all be controlled by voice commands. These functions include voice control command, control message creation and dissemination, situation awareness, display management, and creation and dissemination of graphical operations orders.

The concept incorporates speech recognition technology with Brigade and Below Command and Control as well as Battle Command Decision Support System software in a proof-of-concept demonstration.

Voice control provides the means to interact with computer networks during command-on-the-move operations with a significant reduction in the time required to input data, and it allows interaction with a computer while maintaining an eyes-out-of-vehicle position. (95BCBL-114)

ITT Aerospace/Communications Division, Mr. H. Koble, (619) 578-3080

Battle Command BL, CPT Kelly Lauritzen, (913) 684-2362

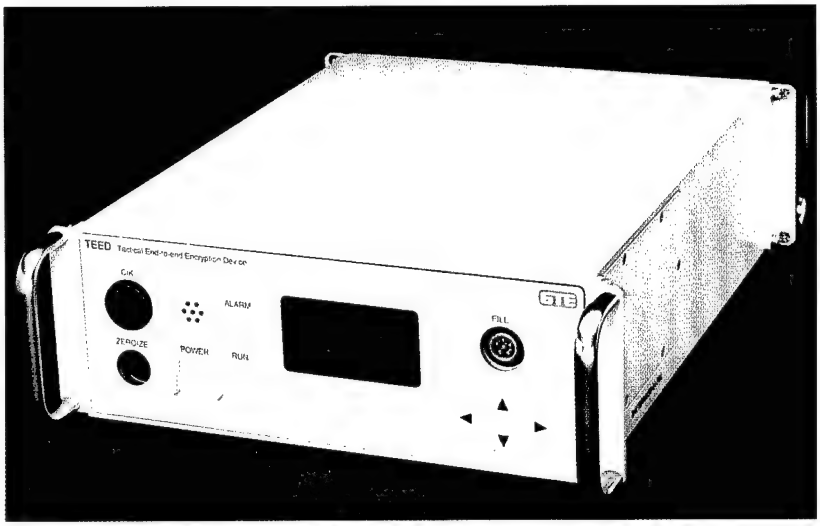
U.S. Army Communications-Electronics Command, Mr. Lockwood Reed, (908) 427-2559

Tactical Encryption Device

The Tactical End-to-End Encryption Device (TEED) will enable secure, seamless computer-to-computer operations across the mobile Tactical Packet Network (TPM), the strategic Defense Data Network (DDN), and the Defense Secure Network (DSN).

This low-cost network security device can be attached to individual computers or shared on LANs which operate at the same security level. TEED will support the 1995 Joint Warrior Interoperability Demonstrations (JWID) in a split base operation linking Continental United States based battle management with a deployed tactical network counterpart.

Appropriate configuration of the device as a "firewall" will provide end-to-end security for the Army's large and varied existing base of computers and software. These devices will ensure security up to the Top Secret level over packet networks that support DoD standard protocols for theater (horizontal) and joint (vertical) operations. This capability is critical in a fully digitized battlefield and, by providing improved security for data networks, helps make joint operations possible. (95CSS-101)



GTE Government Systems, Mr. Charles Plummer, (617) 455-5520

Battle Command BL, Mr. James Widby, (706) 791-8344

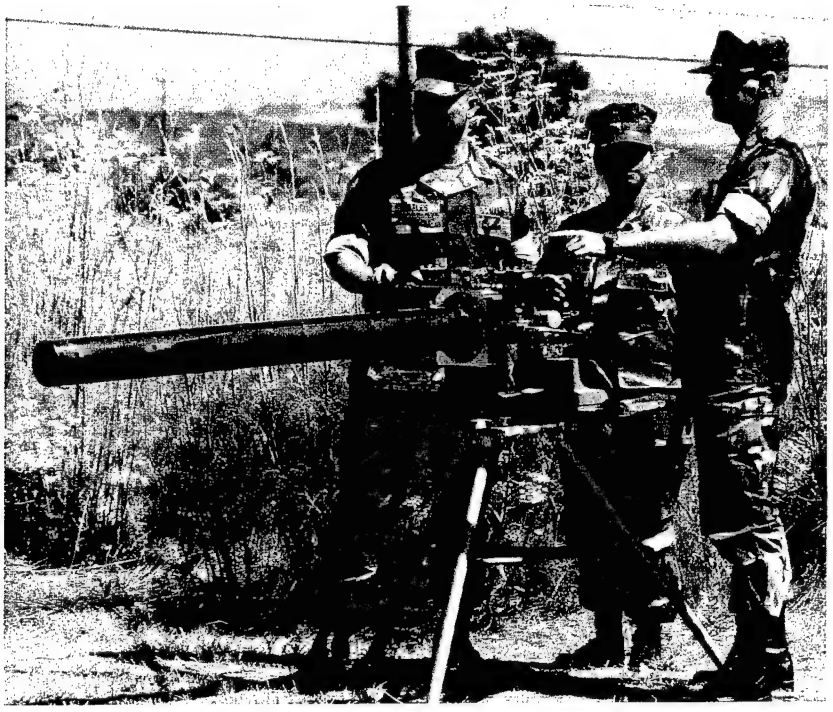
U.S. Army Communications-Electronics Command, Mr. James Chon, (908) 427-3442

High Powered Acoustic Weapon

Provides the Army with a unique and versatile high power acoustic weapon prototype that will provide the Army with a tunable, less-than-lethal incapacitating capability. This device will provide Dismounted Battlespace effects ranging from minor annoyance to total incapacitation.

This effort integrates acoustic high power modulated combustion technology into a prototype crew-served weapon and develops a physiological coupling effects model to predict weapon effects. The demonstration includes measurement and verification of beam formation, side lobes and back lobes, energy as a function of range (watts/sq meter), frequency, and band width. From this information, overall capabilities and requirements will be identified.

This effort provides both a lethal and non-lethal option in a simple, reliable, maintainable weapon that uses common fuel. Use of this new incapacitation mechanism has the potential to revolutionize the battlefield by allowing soldiers to utilize only the force required to prevent escalation and ensure the mission is accomplished. (95DBBL-005)



Science Application and Research Association, Inc., Mr. Jeffrey L. Sollee, (714) 373-5509 ext. 214

Dismounted Battlespace BL, CPT Scott O'Neil, (706) 545-6392

U.S. Army Tank-automotive and Armaments Command, Mr. Harry L. Moore, Jr., (201) 724-7932

Submunition Simulation

Provides the Depth and Simultaneous Attack (D&SA) Battle Lab with a high fidelity, Distributed Interactive Simulation (DIS) compliant simulation for a powered submunition.

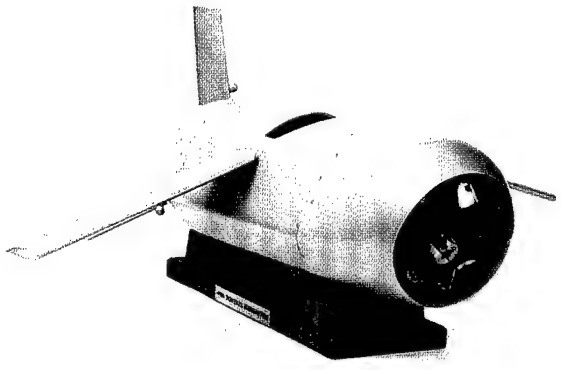
In the FY 1994 ACT II project Next Generation Submunitions (NGSM), performance was projected for a powered maneuverable airframe carrying an automatic target seeker used to search, detect, classify, and locate a target in Global Position System (GPS) coordinates, and then guide the submunition to an aimpoint. This follow-on project will demonstrate a powered Low Cost Autonomous Attack System (LOCAAS) simulation capability at the D&SA Battle Lab to assist the Battle Lab in conducting performance vs. cost tradeoffs and allow the user and developer to conduct both requirements analyses and cost and operational effectiveness Assessments.

The NGSM concept exceeds deep precision attack requirements for fire support missions of the Multiple Launch Rocket System and the Army Tactical Missile System. The simulation will interact with the Target Acquisition fire Support Model, which provides rocket and missile firing data, and enable the Battle Lab to assess combat effectiveness of the NGSM in a variety of scenarios. (95DSA-071/94DSA-036)

Loral Vought Systems Corporation, Dr. Michael M. Tower, (214) 603-1848

Dismounted Battlespace BL, Mr. William Milspaugh, (405) 442-3649

U.S. Army Missile Command, Mr. Meryle M. Hilbert, (205) 876-1246

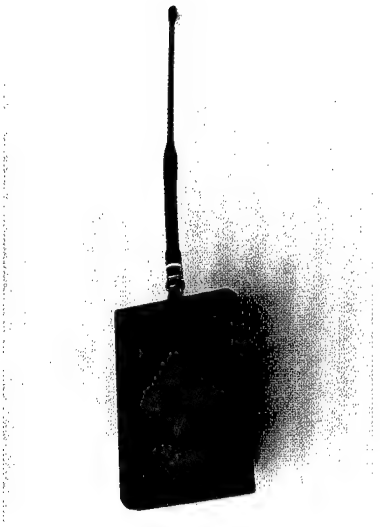


Tactical Sentry Radio

Designs, develops and delivers a hand-held Tactical Sentry Radio (TSR) which, when deployed with a Tactical Sentry System called OmniSense, will alert a soldier to intruders/threats in his battlespace.

The effort demonstrates a cigarette-pack size device that receives messages and alerts from surveillance and intrusion detection systems. A message will instantly tell the soldier where enemy activity has been detected and provide additional information or guidance from the squad or platoon leader. The TSR provides audio, visual and motion alerts and has the capability for the soldier sentry to initiate messages directed to other TSRs.

The use of unmanned sensors with a real-time warning and messaging capability provides key personnel with increased situation awareness and helps control the battle tempo. The TSR assists the individual soldier on surveillance alert to perform his mission and increases his survivability. (95DBBL-010)



McQ Associates, Inc., Mr. Steven Brownell, (703) 373-2374

Dismounted Battlespace BL, CPT Edward Jennings, (706) 545-8345

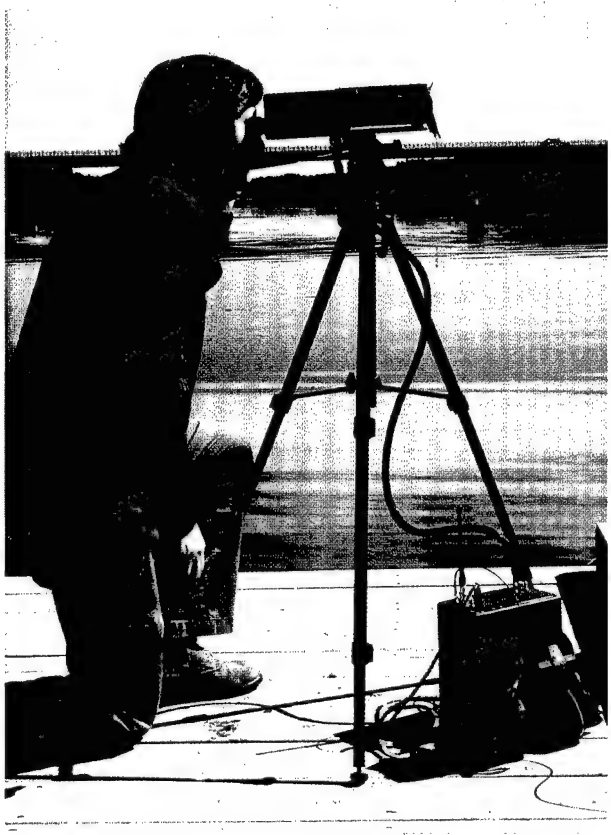
U.S. Army Communications-Electronics Command, Mr. John Flatt, (908) 427-4157

INFOSCOPE

Enhances large-scale, joint simulation-supported exercises by creating a non-interfering eye-piece to fielded optical systems. INFOSCOPE can graphically superimpose into its field of view entities generated by simulation at the appropriate location on the actual exercise terrain.

Warfighting concepts and digitization requirements will be refined based on Advanced Warfighting Experiments (AWEs) and the resulting data fed back into a constructive simulation environment. The link to this virtual environment is to design and conduct AWE vignettes on the terrain that best support the tactical concept being evaluated. The final exercise will be the demonstration of the integrated INFOSCOPE and INFOMASTER/ ModSAF control station.

The concept allows the dismounted soldier to operate in a natural environment for the purpose of operational rehearsal and training. INFOSCOPE enhances the actual views of the world with icons and text describing simulated entities from the virtual and constructive battlefield. It provides live simulation and instrumentation of the dismounted soldier, resulting in increased capability for analysis. (95DBBL-034)



Computer Sciences Corporation, Mr. Ralph Weber, (205) 876-7716

Dismounted Battlespace BL, Mr. Eugene Dutoit, (706) 545-7000

U.S. Army Research Laboratory, Mrs. Brenda Thein, (410) 278- 5945

Soldier Power

Provides electric power to the dismounted soldier from a Proton Exchange Membrane (PEM) fuel cell system. The PEM fuel cell converts hydrogen and oxygen (air) to water while producing electricity.

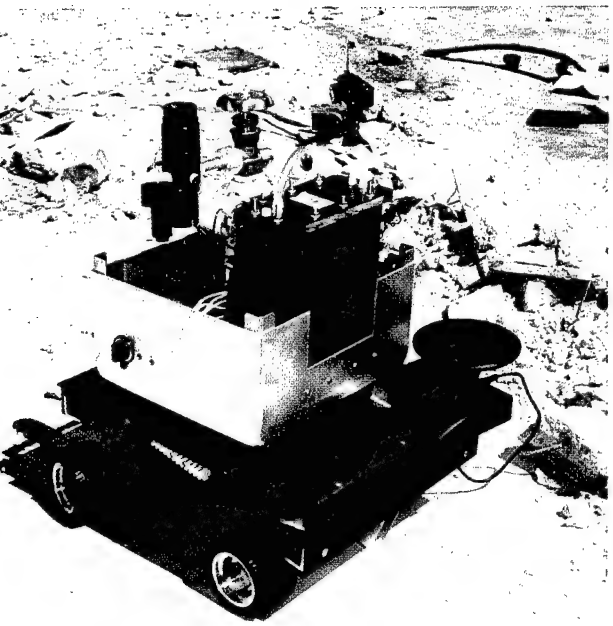
The Soldier Power System (SPS) utilizes a solid fuel (NaBH4) to produce hydrogen as needed when combined with water. The SPS is being designed to provide 150 watts for approximately 16 hours of continuous operations (2400 watt hours). The effort demonstrates an air-cooled, ambient pressure PEM fuel cell which will scale to meet the needs of the individual soldier.

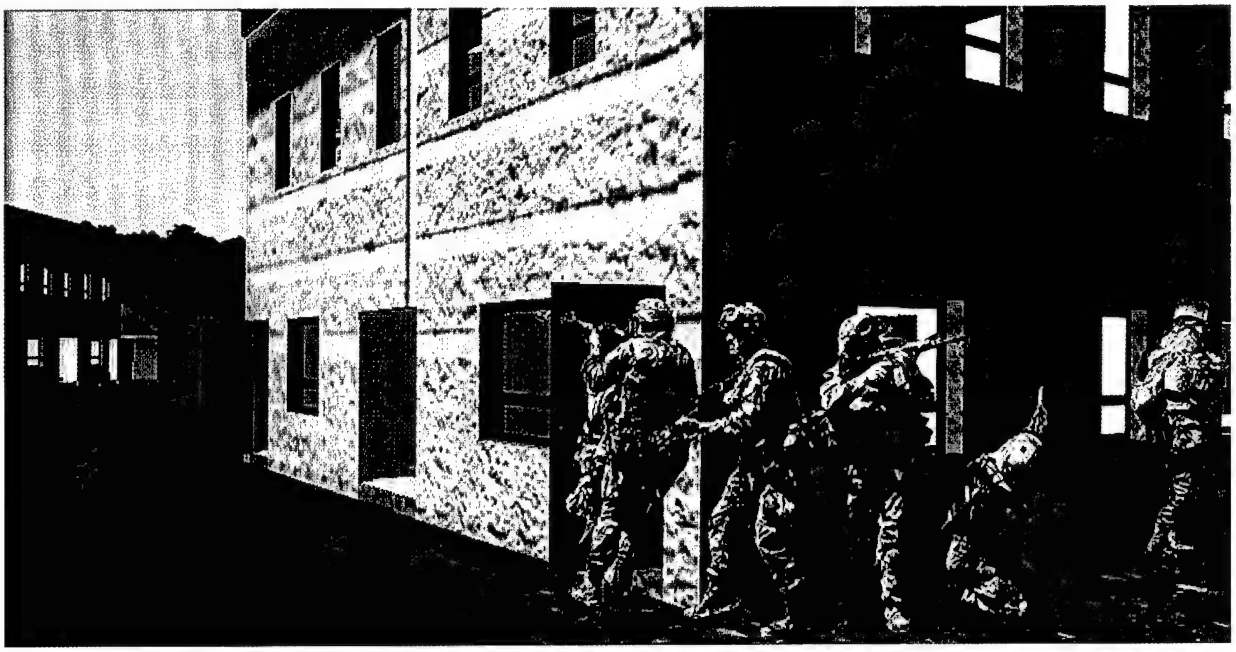
SPS will provide power to the soldier's computer, radio, GPS receiver, and microclimate cooling systems. The concept provides savings in power supply weight and volume that directly affects a soldier's mobility and ability to carry more ammunition. Significant cost savings also are envisioned since SPS operating costs involve only the cost of fuel versus resupply of batteries. (95DBBL-014)

Mr. Dave Bloomfield, Analytic Power Corporation, (617) 542-6352, ext 27

Dismounted Battlespace BL, Mr. Ron Akers, (706) 545-8344

U.S. Army Communications-Electronics Command, Mr. Ed Starkovich, (703) 704-1994





Soldier Modeling and Simulation

Provides the capability to model the individual soldier as a distinct battlefield system and integrate soldier modeling and simulations with force modeling and simulation.

The focus of the effort is to develop and demonstrate an object-oriented, Digital Interactive Simulation (DIS) compliant framework for representing Military Operations in Urban Terrain (MOUT) at the individual soldier level. This tool referred to as the Simulation and Training Aid for the Dismounted Soldier (STRADIS), will provide a high resolution simulation of a dismounted infantry squad conducting urban assault and building clearing. The demonstration will be based on the McKenna MOUT site at Fort Bragg and will use the McKenna Town Hall as the objective building.

A recent Battle Lab briefing stated: "The biggest obstacle to progress in Dismounted Battlespace Lab is lack of simulation capability." This effort will support integration of dispersed simulations in real-time to provide a constructive simulation of dismounted soldiers conducting MOUT. This allows analysts to evaluate an individual soldier as part of a total force and to aggregate/deaggregate the individual soldier into/from the team, squad, and platoon force levels. (95DBBL-068)

Coleman Research Corporation, Mr. Mark Cash, (205) 922-6000 ext. 3038

Dismounted Battlespace BL, Mr. Gene Dutoit, (706) 545-7000

U.S. Army Simulation, Training & Instrumentation Command, Mr. Dave L. MacIntire, (407) 380-4339

Precision Strike: Ferret

This project demonstrates the Ferret ability to detect, recognize, and track a SCUD missile launcher and various other military targets.

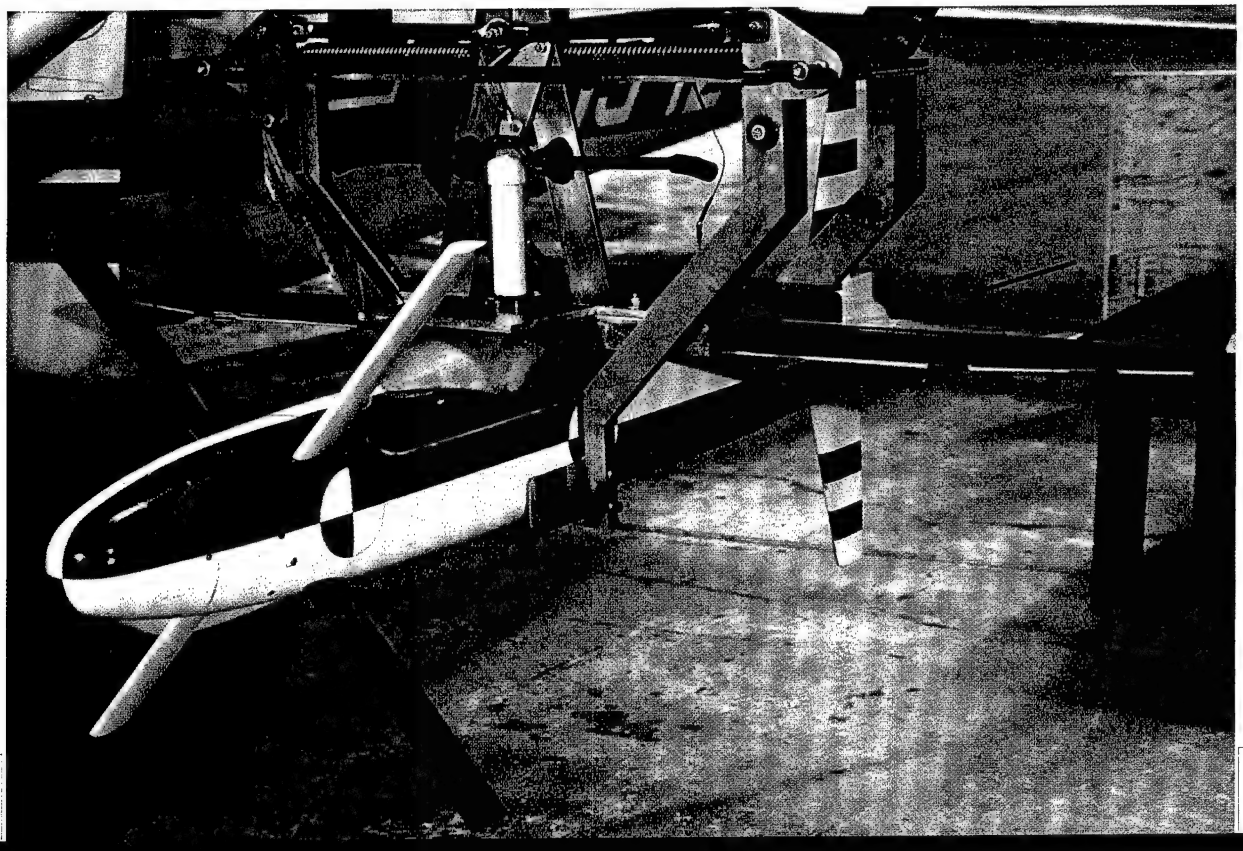
The Ferret design integrates existing off-the-shelf technologies for air or ground launched missiles into a cost-effective, situation awareness, long-range weapon system. This effort demonstrates the ability to detect, locate, classify and engage a critical set of battlefield targets: Surface-to-Air Missile (SAM) sites, Transporter-Erector-Launchers (TELs), Unmanned Aerial Vehicles (UAVs), tanks, and helicopters. Real-time target detection and location will be demonstrated using unpowered flight in the vicinity of a target array.

Ferret provides battlefield commanders real-time, all-weather, day and night enhanced situation awareness over a wide area, coupled with the ability to perform precision attack against ground and air targets. Ferret will have the capability to find, confirm and kill close and deep precision strike targets. It will provide the commander enhanced ability to synchronize deep, joint, and combined fires and the ability to converge on tactical and strategic blindspots on the battlefield. (95DSA-020)

Northrop Grumman Corporation, Mr. Ron Nenner, (310) 948-6897

Depth and Simultaneous Attack BL, Mr. Joe Bowan, (334) 255-2493

U. S. Army Missile Command, Mr. Robert E. Alongi, (205) 876-2961

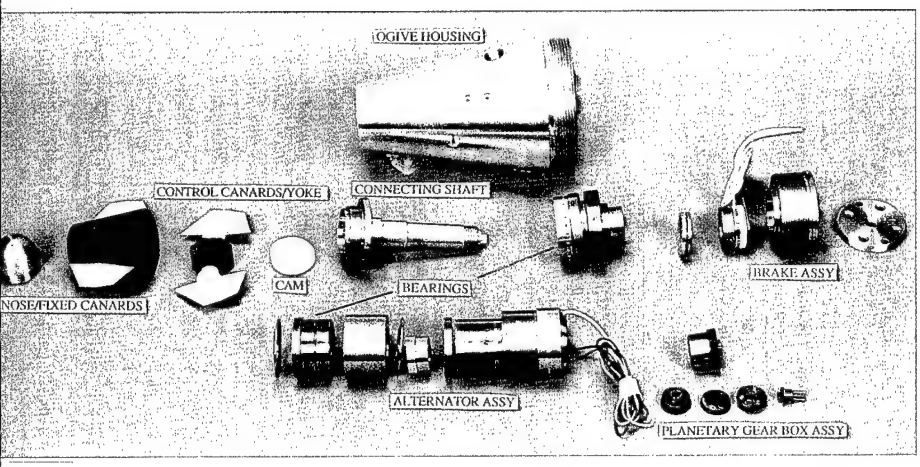


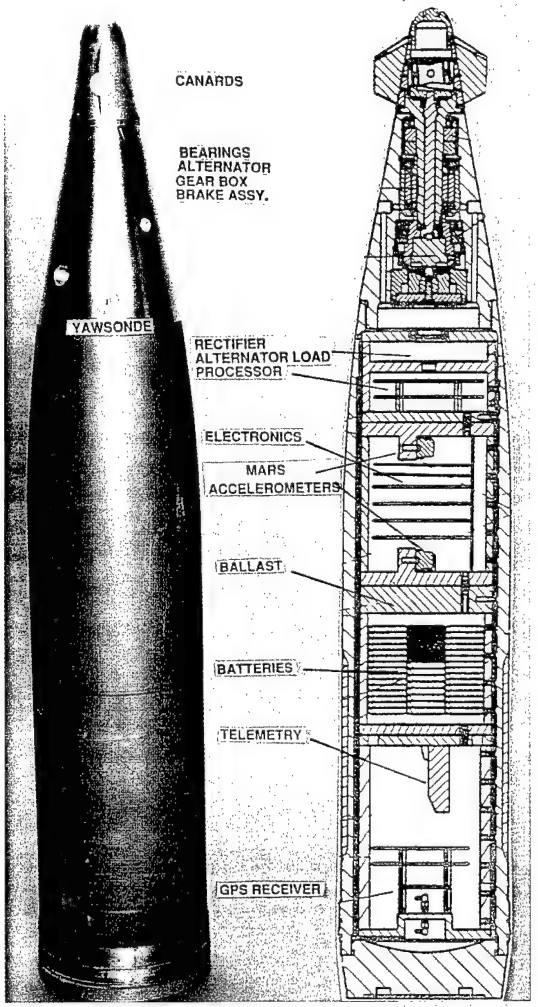
Projectile Flight Control

Demonstrates a Canard Control System Module (CCSM) which can successfully control the trajectory of a 155mm projectile and verifies the CCSM simulation models. A Multiple Accelerometer Rate Sensor (MARS) will also be flight tested to provide data to simulate the use of roll and turn control.

Four Canard Controlled 155mm modified projectiles will be fired at the Yuma Proving Ground to verify the structural integrity of the projectile, canard airframe, activators, telemetry unit, and MARS unit, and the ability to stabilize the canard system in flight and establish the maneuver footprint. The CCSM test will verify the use of canard control as part of an integrated fuze replacement field upgrade for NATO projectiles applicable to current and future 155mm artillery systems.

The concept provides the potential to increase 155mm projectile accuracy by four times at extended ranges, and double current effectiveness. Mission effectiveness, reduced fratricide, and a reduced logistic burden should also be realized. (95DSA-024)





Alliant Techsystems Inc., Mr. Gary Schlickert, (612) 931-5275

Depth and Simultaneous Attack BL, Mr. Dale Bailey, (405) 442-6000

U.S. Army Tank-automotive & Armaments Command, Mr. Raymond Sicignano, (201) 729-3194

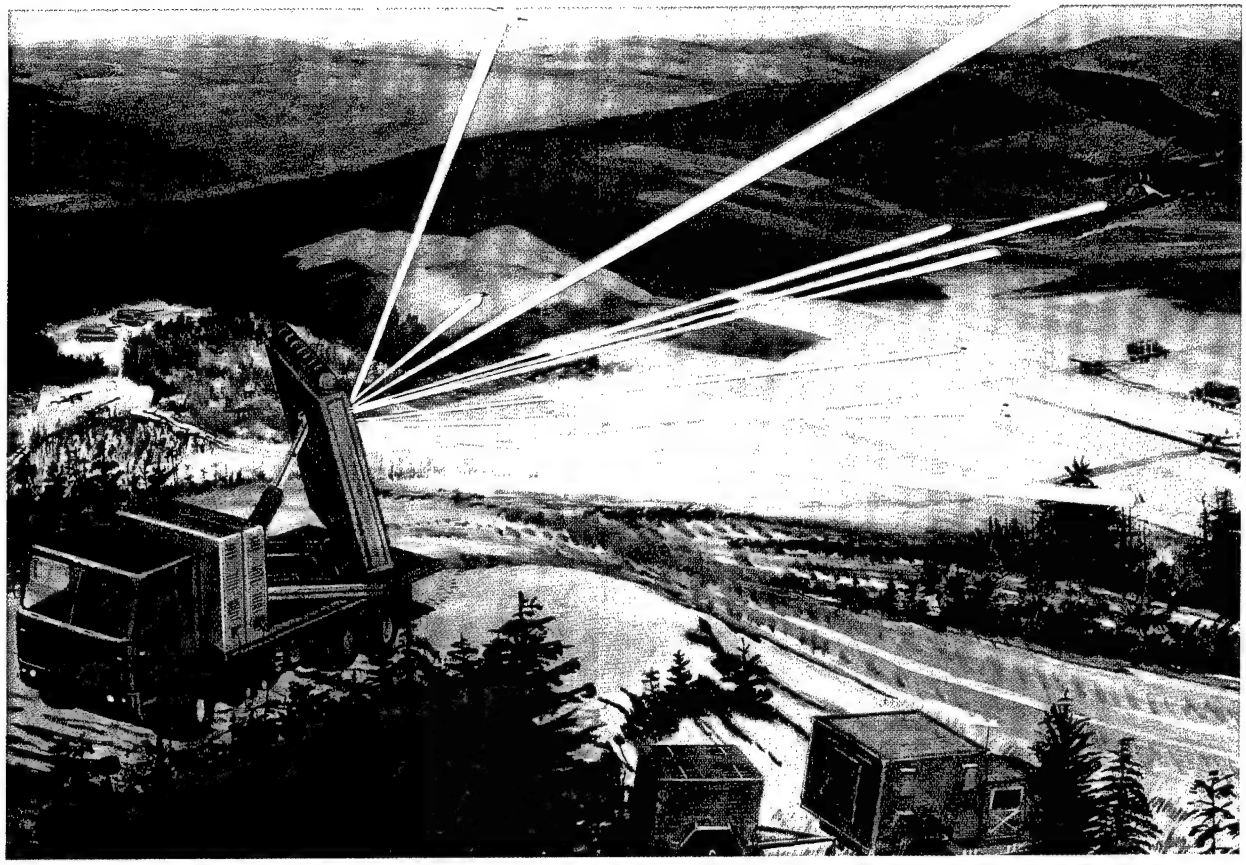
Radar Enhancement

Develop a system approach to meet emerging radar requirements for increasing range, reducing false alarms, increasing throughput, and performing multiple missions.

The concept demonstration will evaluate conceptual designs of TPQ-37 Pre-Planned Product Improvements (P3I) that will meet range-improved mobility requirements. The Radar Operational Evaluation Model will perform beam-by-beam radar simulation to evaluate radar scheduling and performance. The Extended Air Defense Simulation model will perform full-scale warfare simulation to evaluate incremental warfighting effectiveness in realistic battle situations.

Improvements to the TPQ-37 radar follow-on systems will meet new requirements for fire support, Tactical Ballistic Missile launch detection/hand-off, and air defense. The goal is to reduce the target-to-sensor timeline for real-time artillery targeting, joint precision strikes, and Theater Missile Defense mission support.

(95DSA-025)



Lockheed Martin Government Electronics Systems, Mr. Thomas McNelis, (609) 722-6090

Depth and Simultaneous Attack BL, CW3 Mark Graybeal, (405) 442-3652

U.S. Army Communications-Electronics Command, Mr. Pete Gilkerdas, (908) 427-5366

Joint STARS Assessment

In order to fully exploit the Joint Surveillance and Target Attack Radar System (STARS) during hostilities, robust connectivity to communicate information among Command and Control (C2) nodes, individual Army helicopters, fire support centers, ground maneuver units, and other joint elements must be maintained.

This effort investigates new and innovative ways of exploiting the extremely accurate deep-look potential of Joint STARS to benefit Army aviation and ground attack systems.

A virtual prototype opportunity for developing tactics and doctrine will be provided. This allows commanders a much deeper look into the battlefield and the ability to attack staging areas or other strategic targets. (95DSA-062)

Northrop Grumman Corporation, Mr. Pat Oliver, (401) 726-7767

Depth and Simultaneous Attack BL, MAJ Donald Huntley, (405) 442-2928

U.S. Army Aviation and Troop Command, Ms. Hilda Fowler, (804) 878-4818

Improved Operational Assessment

Demonstrate and evaluate the application of an affordable, next generation receive-only digital Link-16 terminal (i.e., Joint Tactical Information Distribution System (JTIDS) terminals), and determine if this reduced functionality Joint Air Defense Artillery operations system can access the battlefield air picture.

The approach utilizes a receive-only JTIDS terminal to demonstrate the contribution to improve warfighting capability in joint force operations in the execution of air defense operations. A second portion will evaluate the benefits of using GPS time standards for JTIDS network timing.

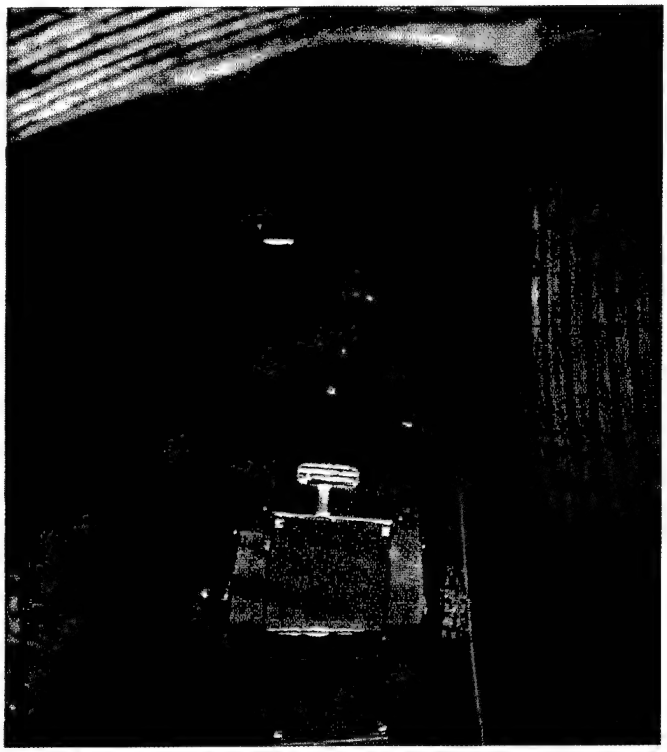
The technology offers the Army the opportunity to implement a high capacity, interoperable link that will greatly enhance the goal of a digitized battlefield. (95DSA-030)

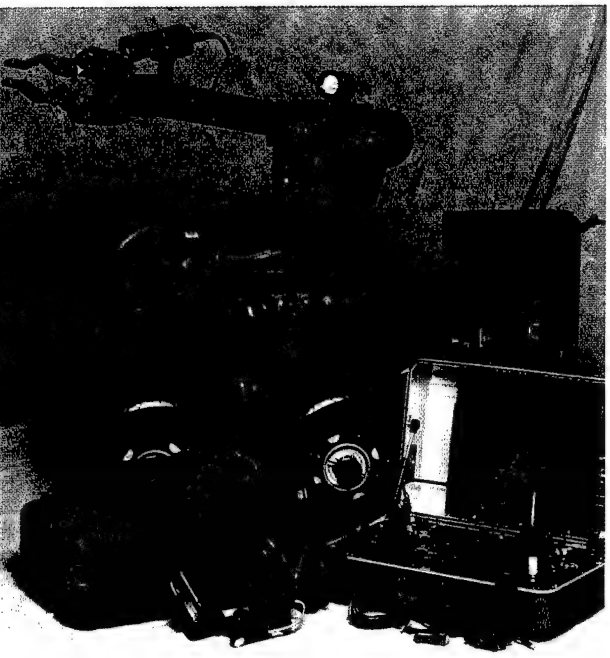
Rockwell International Corporation, Mr. Mark M. Schmaltz, (319) 395-8507

Depth and Simultaneous Attack BL, Mr. Patrick McCartney, (405) 442-6954

U.S. Army Communications-Electronics Command, Mr. Francis L. Schurogot, Jr. (908) 427-2793

Unmanned Ground Vehicle





Explore the feasibility and operational benefits of using commercially available Unmanned Ground Vehicle (UGV) technology to detect, mark, and neutralize obstacles, mines, and demolitions during early entry operations in an urban environment.

The program employs four commercial UGVs to evaluate feasibility and operational benefits. These customized UGVs are of the type used by civilian fire and law enforcement personnel and will be used by soldier operators in a series of realistic early entry scenarios to verify the design study results. The scenarios will demonstrate the use of UGVs under day (including obscurants), night, and adverse weather conditions for clearing buildings and surrounding areas of obstacles and mines.

The concept reduces the time and danger involved when clearing buildings and urban terrain of mines, obstacles, demolitions, and improvised explosive devices, and increases the survivability of early entry forces performing these missions.

(95EELS-003)

Westinghouse Electric Corporation, Mr. Richard Raymont, (205) 971-4887

Early Entry Lethality and Survivability BL, MAJ Tom Hite, (804) 727-3096

U.S. Army Missile Command, Ms. Suzy Yound, (205) 876-5663

Improved Cargo Through-Put

Provides an improved container lifting frame system that will allow for safe and expeditious cargo off-loading from ships to Army lighterage in sea state 3 and above.

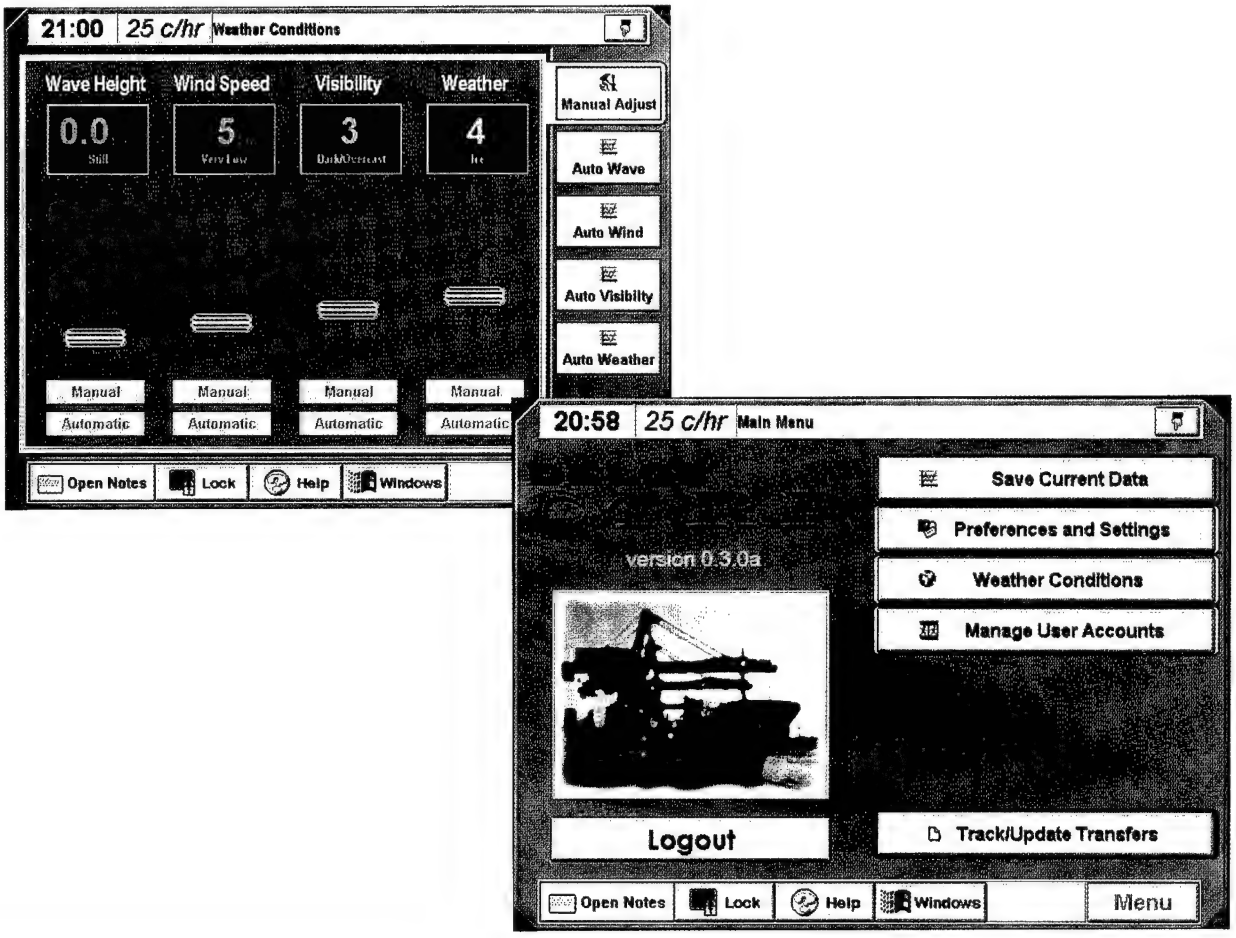
The approach includes the demonstration of a computer program that provides a real-time, practical assessment of container throughput given data on the variable conditions and factors. Output would be available for both the unit commander in charge of the container transfer, and the commander of Joint Logistics-Over-The Shore. A second demonstration will show that container handling can be made safer using an improved spreader bar system that uses a very lightweight positioning frame to make first contact with a container.

The concept speeds logistics supply, allows commanders to predict when supplies will arrive, and provides the ability to deliver in high sea state conditions. (95EELS-037)

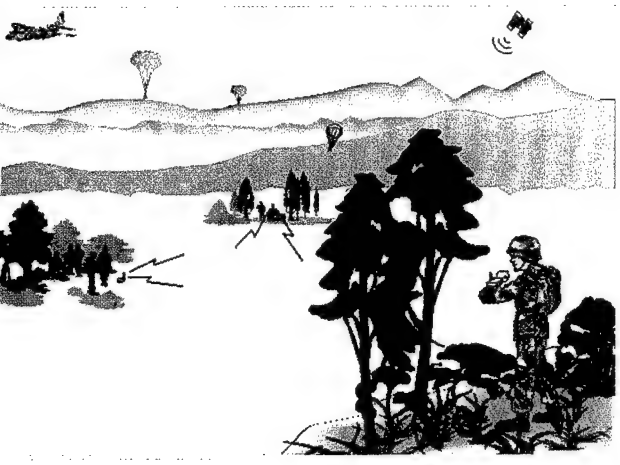
M.J. Plackett & Associates, Mr. Michael J. Plackett, (503) 929-2676

Early Entry Lethality and Survivability BL, CPT Frank Alston, (804) 727-3677

U.S. Army Tank-automotive and Armaments Command, Mr. Carl Johnson, (810) 574-5785



Drop Zone Assembly Aid



Design and demonstrate the effectiveness of a GPS-based electronic prototype Drop Zone Assembly Aid (DZAA) system for rapid assembly of air-dropped equipment and troops.

The DZAA is comprised of a beacon transmitter and a hand-held location receiver. The beacon calculates its position from GPS and broadcasts this position via a low-probability-of-intercept data link. A wrist-worn locator receives the beacon's position and calculates range and heading to the beacon. Using actual troops in an airdrop scenario, the demonstration will show the enhanced effectiveness of the DZAA.

The concept links crew personnel to platforms and vehicles for rapid reassembly of forces and equipment into a cohesive combat force. The concept enhances battlefield navigation for small units by assisting them in finding rally points, resupply caches, and reentry points, as well as marking safe lanes through mine fields and abandoned or high-value equipment. (95EELS-051)

E-Systems, Inc. Montek Division, Mr. Jeff Braybender, (801) 974-7334

Early Entry Lethality and Survivability BL, MAJ Lee Holland, (804) 727-3247

U.S. Army Communications-Electronics Command, Mr. George Stanko, (908) 427-5547

Over-The-Shore Logistics

Develops a simulation for a Logistics-Over-the-Shore (LOTS) virtual environment to take full advantage of current capabilities in high performance computing, graphics, and distributed interactive simulation.

An in-depth design phase and a functional prototype development phase will allow the design, evaluation, and training associated with strategic sealift and LOTS.

The virtual environment will provide the ability to evaluate logistics operations in close approximation to actual operating environments without the need to stage major live exercise. (95EELS-056)

Advanced Marine Enterprises, Mr. Eugene Miller, (703) 413-9200

Early Entry Lethality and Survivability BL, LTC Scott Callendar, (804) 727-3911

U.S. ArmyWaterways Experimental Station, Mr. Donald Resio, (601) 634-2018

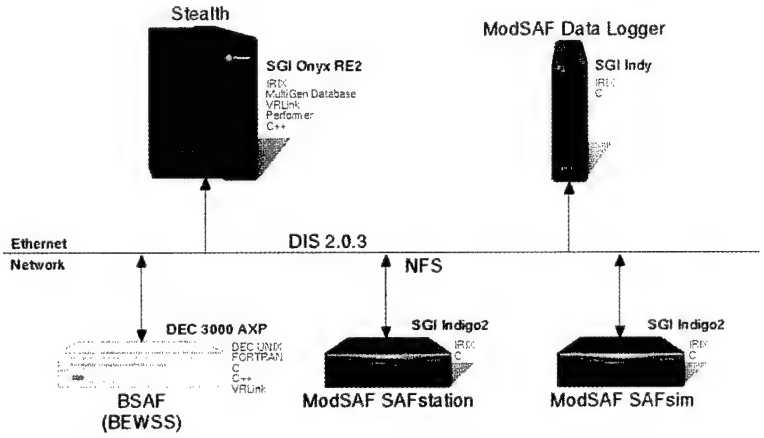
Early Entry Simulation

The Interactive Distributed Early Entry Analytic Simulation (IDEEAS) integrates a high fidelity Battlefield Environment Weapon Simulation System (BEWSS) constructive forces model with the interactive tactical environment of the Model Semi-Automated Forces (ModSAF) simulation system using a computer-generated forces graphical user interface.

IDEEAS will interface through the Defense Simulation Internet (DSI) to Distributed Interactive Simulation (DIS) compliant command and control simulators, weapon systems prototypes, and logistics models. This simulation will allow analysis of the impact of technologies and tactics on early entry force effectiveness. The approach leverages mature capability in both engineering modeling and virtual simulation to create a new analytical tool. Actual scenarios will be executed in BEWSS and displayed at the ModSAF workstation.

Quick turn around analyses of early entry battle dynamics, including command and control and system performance, will ensure a good fit between user needs, evolving system technology, and tactics. The IDEEAS operator will be able to start, stop, modify, and resume the scenario to perform "what if" analyses. (95EELS-089)

IDEEAS CONFIGURATION



Computer Sciences Corporation (CSC), Mr. Abner Lee, (205) 837-7200 ext. 205

Early Entry Lethality and Survivability BL, LTC Scott Callendar, (804) 727-3911

U.S. Army Missile Command, Mr. Robert E. Alongi, (205) 876-2962

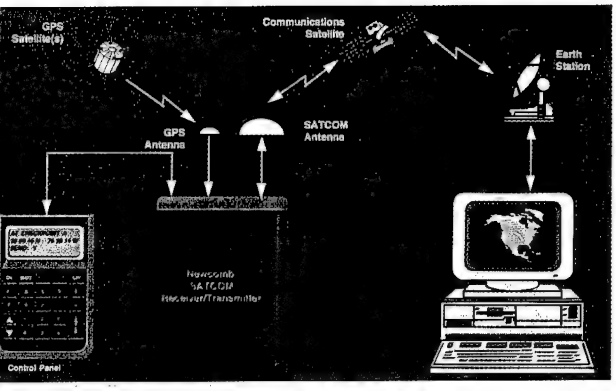
Combat Identification via Satellite

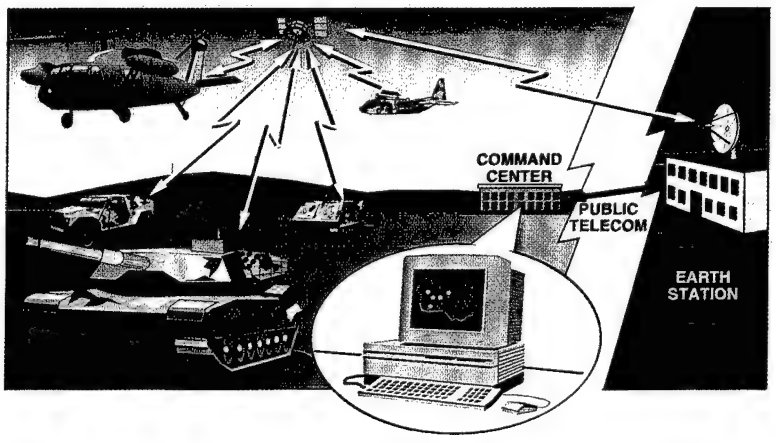
Integrates and demonstrates a proof-of-concept of a combat identification system (CID) using existing off-the-shelf satellite communications technology, equipment, and services.

The approach demonstrates the capabilities of two-way satellite communications for CID and tracking of friendly forces, including automatic or on-demand reporting of combat vehicle position and identification. Combat Identification via Satellite Communications (COMIDS) incorporates GPS receivers and uses spread spectrum, short duration low probability-of-intercept communications with a low profile aerodynamic antenna. The system will be demonstrated in the Advanced Warfighting Exercise (AWE) "Roving Sands" at Fort Bliss, TX and in "Focus Dispatch" at Fort Knox, KY.

The concept provides mobile satellite communications for active or passive CID and near real-time reporting of the identity and position of Army battle assets. Commanders are able to direct mission events by sending short text messages. COMIDS will improve situation awareness and friendly force tracking, reduce fratricide, and improve command, control and communications.

(95LAM-094)





HRB Systems, Inc., Mr. Jim Jacobson, (814) 238-4311 ext. 3114

Louisiana Maneuvers Task Force, Mr. Paige Cherry, (804) 728-5335

U.S. Army Communications-Electronics Command, Mr. Dennis M. Peras, (908) 532-6191

Aviation Satellite Communications

Develop, integrate and demonstrate an Aviation Satellite Communications (AVSATCOM) capability utilizing off-the-shelf satellite communications with airborne terminals using spread spectrum technology via commercial INMARSAT service.

Experiments will be performed to determine the optimal location for the antenna on a UH-60 Blackhawk helicopter. Various types of modulation will be tested to optimize Low-Probability-of-Interception/Detection (LPI/LPD) communications. The demonstration flight will relay aircraft positions received from a Global Positioning Satellite (GPS) receiver and aircraft sensors, and provide two-way messaging while performing nap-of-the-earth and over-the-horizon maneuvers.

The AVSATCOM will extend the range of helicopter communications by providing a communications link by which the operations center can monitor aircraft status sensors, communicate in full duplex data, and track the aircraft using GPS receiver data. (95LAM-108)

Booz, Allen & Hamilton, Inc., Mr. James Doyle, (908) 935-5183

Louisiana Maneuvers Task Force, Paige Cherry, (804) 728-5335

U.S. Army Communications-Electronics Command, Mr. Chu Lai, (908) 532-9783

Biological Decontamination

Transition a laboratory proof-of-principle demonstration to a prototype device capable of biological decontamination and protection of soldiers from biological warfare agents. The prototype will maintain a safe environment inside a vehicle crew compartment for a period of eight hours.

The technology explores the use of high intensity broad-band pulsed-light to deactivate micro-organisms. This is an adaptation of technology used to sterilize dairy products such as yogurt.

This biological decontamination device will provide the soldier enhanced protection against biological agents without requiring protective garments, and can provide early entry forces protection in operations in a theater with unknown threats.
(95LAM-025)

OptiMetrics, Inc., Ms. Cathy L. Barbaro, (410) 893-9714

Louisiana Maneuvers Task Force, Paige Cherry, (804) 728-5335

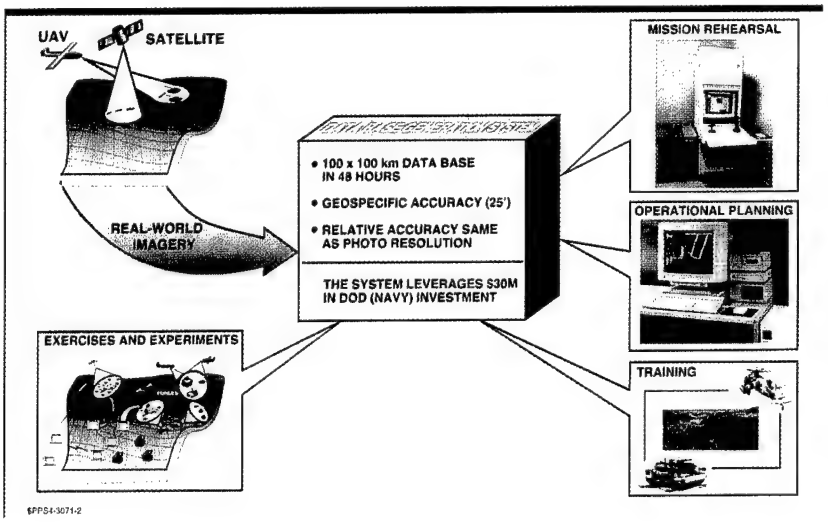
U.S. Army Edgewood Research, Development and Engineering Center, Dr. Charles Wick, (410) 671-3321

Synthetic Environment Database

Deliver a prototype data base generation system for synthetic environments, compatible with Simulation Network (SIMNET), Combined Arms Tactical Trainer (CATT), and Distributed Interactive Simulation (DIS) applications.

This effort demonstrates the rapid generation of a 100-by-100 km geo-specific database for use in photographic quality systems, SIMNET, CATT, and other DIS applications. Input data from photo images, maps, radar, or other sources will be processed within 48 hours. The resulting database will be compatible with a DIS environment that is capable of supporting mission rehearsal.

The concept provides the Army with the capability to replicate terrain features and cultural description in a timely manner with sufficient accuracy to enable real-world mission rehearsal, operational planning and analytical simulations. (95LAM-087)

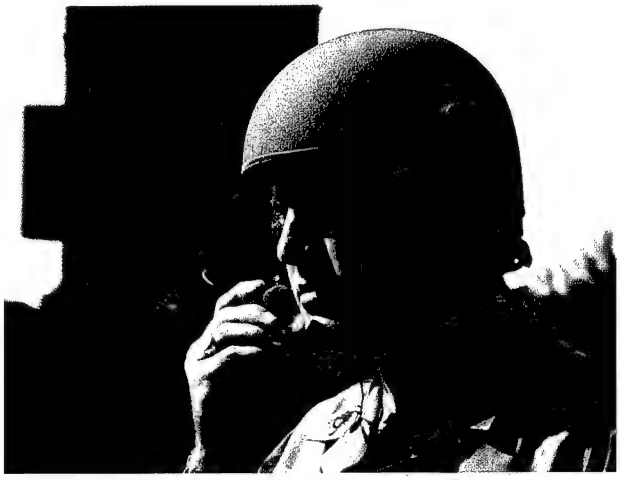


Loral Vought Systems, Corporation, Mr. C.E. Mattlage, (214) 603-9040

Louisiana Maneuvers Task Force, Mr. Paige Cherry, (804) 728-5335

U.S. Topographical Engineering Center, Mr. Tom Witte, (703) 355-3177

Hands-Free Wireless Communications



Updates the FY 94 INTELCOMplus wireless headset to include advanced noise reduction and integration of the transceiver onto the ear piece. This effort incorporates improved "talk-through" capability, hands-free operations, and provides global gateway communications which can interface with the Army Wide Area Network and combat net radios. Voice activated switching and speech recognition will be incorporated to ensure the system is user friendly.

INTELCOMplus will demonstrate a clear, noise-free voice communication interface, and include hearing protection and voice-commanded operation for each individual crewman in various Army vehicle platforms. The system incorporates passive and advanced active noise reduction/cancellation techniques, frequency hopping, and voice recognition. It will provide intercom communication for local users and gateways to global communication for remote areas.

INTELCOMplus provides a secure, hands-free, wireless digital communication system for clear communications in very noisy environments. This system reduces fatigue, and increases performance, safety, and capability. (95MTD -015)

Northrop Grumman Corporation, Mr. Robert Salzmann, (516) 224-8063

Mounted Battlespace BL, CPT Mike Spragg, (502) 624-2169

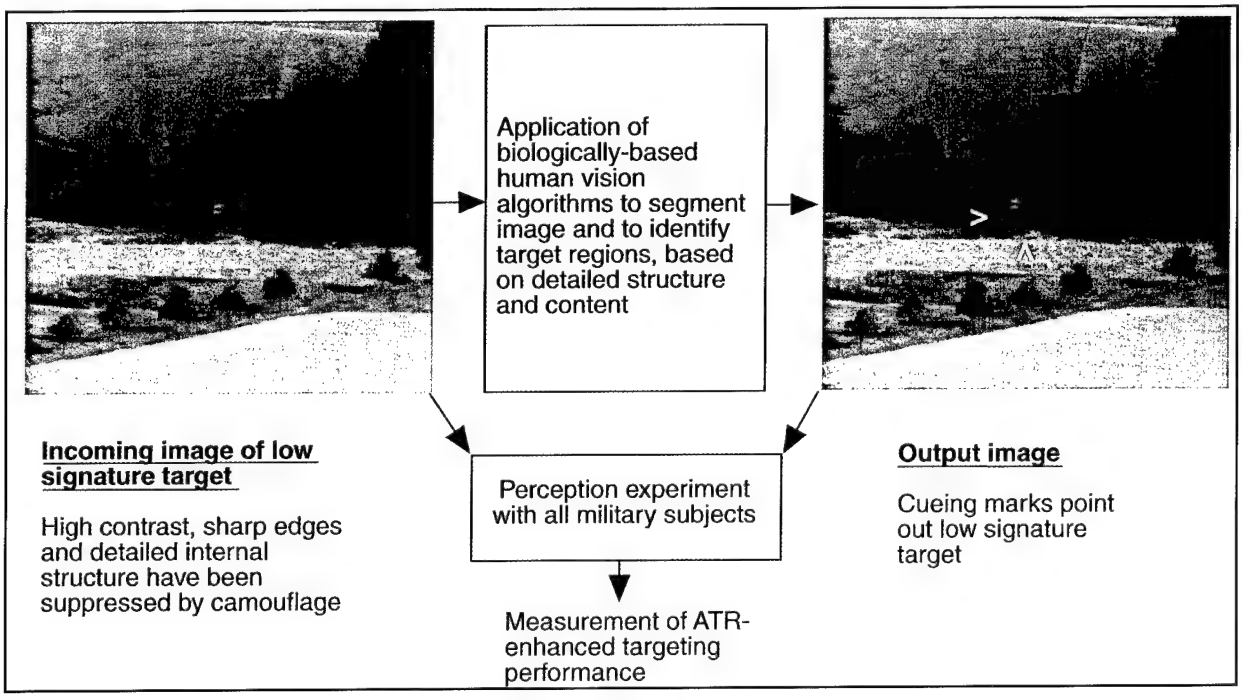
U.S. Army Communications-Electronics Command, Mr. Tat Y. Fung, (908) 532-0054

Automated Recognition of Low-Observables

This project will develop a software package to evaluate and demonstrate algorithms for enhancing the capability of observers to find and recognize low-observable targets. It will use man-in-the-loop sensor imagery including common module FLIR and visual optics.

The approach demonstrates the operation of a software system which identifies unique features in a sensed image and enhances those features to stand out in a displayed image. The images are adjusted according to a selected "gain strategy" for translating differences in signature vector into enhanced visual features.

The concept provides the commander with a "second set of eyes" to reduce search time for detection, recognition and enhancement of difficult to detect targets. The system hands-off target location to the next level of fire support; thereby enhancing the lethality and survivability of the soldier's position during battle. (95MTD-027)



OptiMetrics, Inc., Mr. George H. Lindquist, (313) 973-1177

Mounted Battlespace BL, CPT Scott Troutman/ CPT Andy Dreby, (502) 624-2169

U.S. Army Tank-automotive and Armaments Command, Dr. Grant Gerhart, (810) 574-8634

Electronic Defense for Combat Vehicles

This jamming system, called Rx-IMAGE, uses a new area defense electronic countermeasure concept to defeat smart, top-attack munitions targeting Army land combat vehicles.

The concept should be effective against a variety of current and future sensor fused munitions and precision guided munitions. Munitions whose effectiveness could be degraded include those with RF seekers; reticle, rosette scan and focal plane array infrared seekers; and dual-mode seekers.

The jammer disrupts critical electronic functions of top-attack munitions that rely on radio frequency, infrared or dual-mode seekers. The jamming will degrade a munition's aimpoint accuracy, thus increasing the survivability of Army land combat vehicles. The ability of the jammer to provide area defense for a group of vehicles should result in reduced system cost when compared with the alternative of providing a point defense system for each vehicle at risk. (95MTD-084)

Loral Advanced Projects Division, Dr. J.R. Mayersak, (703) 367-2371

Mounted Battlespace BL, CPT Robert Sutter, (502) 624-1978

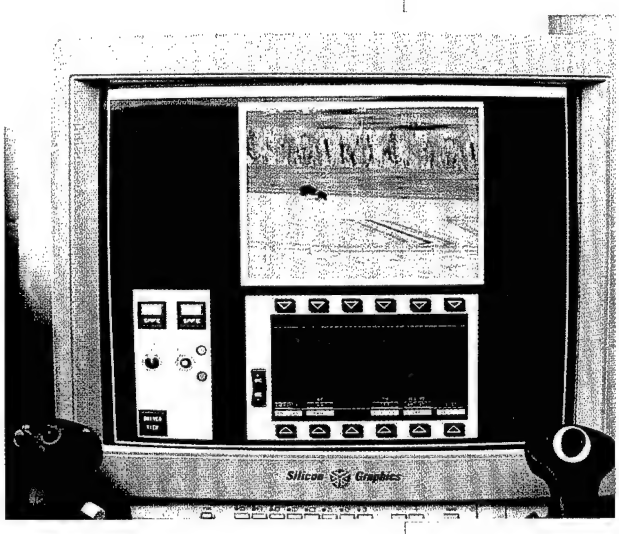
U.S. Army Tank-automotive and Armament Command, Mr. Al Schumacher, (810) 574-6616

Electromagnetic Gun Virtual Prototype

Develops a Distributed Interactive Simulation (DIS) compatible future main battle tank virtual prototype to enable soldier evaluation and input into next generation armored vehicle design. In particular, the program will permit evaluation and trade-off studies of electromagnetic (EM) gun attributes.

This program will develop a state-of-the art virtual prototype for an electromagnetic gun main battle tank, evaluate the warfighting capability of that prototype, and develop an automated method to enhance, maintain and modify prototype characteristics. EM gun parameters will be derived from the engineering data and experience generated in the Army's Electromagnetic Armament System Focused Technology Program.

The simulation will facilitate EM gun prototype updating, modification and component comparison. It will provide the Army with a tool to systematically examine the warfighting benefits and options provided by EM gun capabilities. (95MTD-061)



Loral Vought Systems Corporation, Mr. Robert J. Taylor, (214) 603-9096

Mounted Battlespace BL, Ms. Deana Lutz, (502) 624-1766

U.S. Army Tank-automotive & Armaments Command, Ms. Catherine John-Angl, (201) 724-3214

Water Purification

A cartridge filter containing a new biocide N-halamine polymer can serve in the dual role as a disinfectant and detoxicant for military potable water. A hand-held device will be developed for the individual soldier.

The effectiveness of the cartridge as a biocide and a chemical detoxicant will be determined by demonstrating the removal of selected organisms and chemical agents from water. Challenge organisms in worst case test water will be removed at various temperatures and acidity/alkalinity. Detoxification of chemical stimulants for mustard, VX and Soman will also be determined.

An effective portable water purifier will lessen water-supply logistics burdens such as these experienced during operation Desert Storms and facilitate special operations. (95CSS-018)

Auburn University, Professor S. D. Worley, (334) 844-6980

Combat Services Support BL, CPT Scott Wright, (804) 734-0496

U.S. Army Soldier Systems Command, Mr. Edmund M. Powers, (508) 223-4985

Automated Logistics

Evaluates the use of a store-and-forward message system to request essential mission support data by field commanders.

This project incorporates elements of the Navy's Streamlined Automated Logistics Transmission System (SALTS) to provide tactical units with total asset visibility as close to the front lines as possible. SALTS uses PC-based software with sophisticated addressing and data compression techniques to transfer lengthy data information over different transmission media that include satellites, land lines, cellular equipment, and the Defense Data Network.

SALTS is able to interface with multiple, non-interoperable databases and, consequently, can provide tactical units with access to the most current materiel distribution information.

(95CSS-049)

Advanced Communications Systems, Inc., Mr. David K. Bandy, (703) 934-8130

Combat Service Support BL, Mr. Tom Burnette, (804) 734-2712

U.S. Army Communications-Electronics Command, Mr. Eugene Bajew, (908) 427-2592

Maintenance Assistant

Builds and demonstrates Natural Language Processing into an existing virtual reality-based National Guard M1A1 Maintenance Trainer.

The Advanced Maintenance and Assistance Training System (AMATS) will employ state-of-the-art technologies in virtual reality, knowledge-based systems (AI), natural processing, and speech recognition and synthesis employing both normal and maintenance jargon. AMATS will demonstrate an interactive 3-D training system incorporating maintenance, diagnostics, and repair procedures. Access to AMATS is via voice dialogue with 3-D presentation views of systems, components and test equipment.

AMATS provides a cost-effective, expert assistant and trainer to the soldier engaged in maintenance, allowing voice communications with the maintenance assistance computer while performing maintenance tasks. Deployed with the soldier, the system reduces or eliminates the need for paper technical manuals, and the need to move back and forth between the maintenance manual and the tank. This results in significant time and cost savings. (95CSS-085)

Research Triangle Institute (RTI), Mr. R. Jorge Montoya, (919) 541-6807

Combat Service Support BL, Mr. Thomas Burnette, (804) 734-2712

U.S. Army Simulation, Training and Instrumentation Command, Mr. Wesley A. Milks, (407) 381-8789

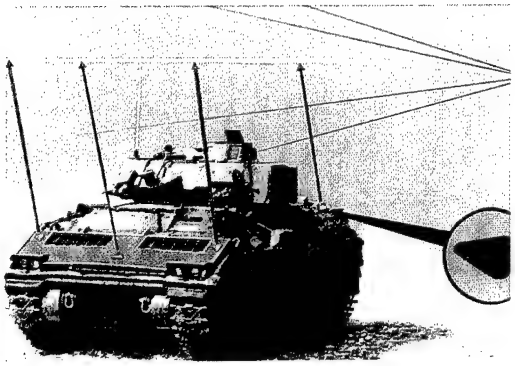
1994 Accomplishments

Soldier Command and Control

The Soldier Command and Control (SCC) program built upon work performed and lessons learned from the Soldier Integrated Protective Ensemble ATD and the 21st Century Land Warrior program. SCC integrates a lightweight soldier computer (486 processor), a handheld SINCGARS radio, a Helmet-Mounted Display (32x24 mm, VGA, 640x480), a lightweight camera, and a Remote Input Device. The integrated C4I system greatly increases individual soldier productivity, thereby enhancing lethality, survivability, and sustainability. (94DIS-005)

Litton Data Systems, Inc., CECOM, Dismounted Battlespace BL

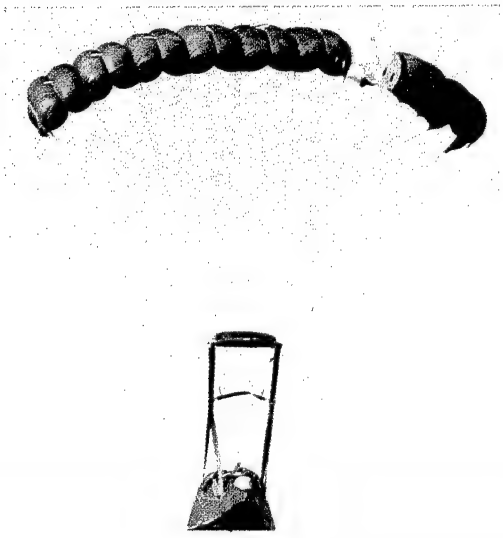
Projectile Detection & Cueing (PDCue)



PDCue demonstrates the ability of an acoustic-based sensor system to accurately predict, point of origin, and classify supersonic projectiles. This brass-board, proof-of-principle system consists of an acoustic sensor array, front-end electronics, computer hardware and software. PDCue was demonstrated at the Transonic Range at Aberdeen Proving Ground, MD against a mix of small and large caliber rounds at various ranges. The system improves survivability and effectiveness of the dismounted soldier and mounted forces. As a counter-sniper system, PDCue is applicable to Special Operations-Limited Intensity Conflicts (e.g., peace keeping operations). (94DIS-036)

AAI Corporation, TACOM, Dismounted Battlespace BL

Precision Guided Airdrop



This effort developed and demonstrated a precision airdrop parachute system that relied on a GPS-based guidance navigation and control system. An industry-developed GPS/Inertial Navigation System was integrated into a NASA subscale spacewedge equipped with a sport class parafoil. This system provides a long stand-off capability which eliminates the need for delivery aircraft to fly over a defended target or to cross sensitive air borders. The added capability enhances early entry, peacekeeping, and humanitarian relief operations by providing increased accuracy and the capability to service any ground positions from a single, long stand-off delivery point, reducing the number of aircraft required to support some missions.

(94EELS-038)

Draper Labs, Inc., MICOM, Early Entry, Lethality and Survivability BL

MultiSIM for Distributed Modeling

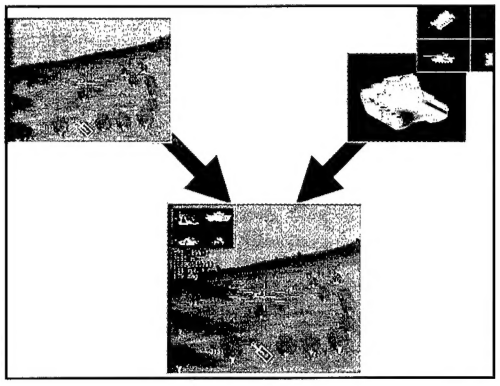
This effort developed a flexible Distributed Interactive Simulation (DIS) compliant simulation of Intelligence and Electronic Warfare (IEW) sensors for use in Advanced Warfighting Experiments. MultiSim provided the ability to generate virtual prototypes of sensor and information processing systems, develop tactics, and assess capabilities and vulnerabilities on the battlefield. MultiSIM-DIS can be used in Joint Precision Strike Demonstration (JPSD) and other exercises to represent IEW sensors and processing which can improve deep strike weapon employment and combat effectiveness.

(94DSA-035)

OptiMetrics, Inc., STRICOM, Depth and Simultaneous Attack BL

LADAR Targeting System (LATARS)

LATARS uses advanced software to combine Forward Looking Infrared and GPS cueing with Laser Radar (LADAR) 3-D imagery, to provide a high confidence that instantaneous identification and location of combat systems can be made. LATARS has the potential to revolutionize digitization of the battlefield since the imagery data can be provided over existing/ projected communication networks. Battlefield synchronization is significantly improved by quickly sharing reliable information to facilitate command and tactical targeting decisions, fratricide reduction, mission effectiveness, and mission timeline improvements. (94MTD-023)



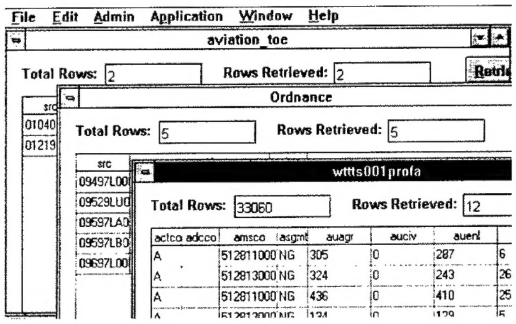
Loral Vought Systems, CECOM, Mounted Battlespace BL

Wireless Battlefield Communication

The Wireless Battlefield Communication System is a highly adaptive short-range frequency hopped, spread spectrum digital radio network. It uses Time Division Multiple Access (TDMA) technology for the dynamic and mobile needs of the battlefield. This system provides a secure robust communications capability in a total peer-to-peer network for lower echelon activity on the dynamic battlefield. Each soldier's radio acts as its own node, permitting constant reconfiguration of networks and the capability of self healing if a radio is lost. (94BCBL-039)

Telephonics Corporation, CECOM, Battle Command BL

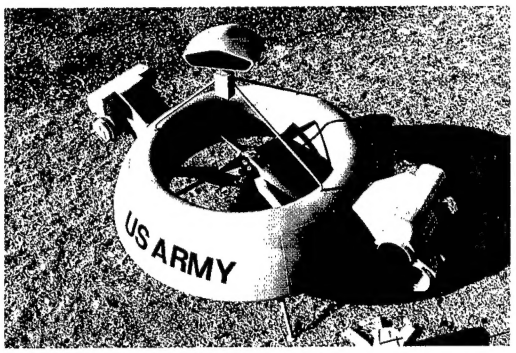
Executive Information System



The Executive Information System (EIS) enhances the Army's capabilities to rapidly generate relevant scenarios and develop requirements for planning procurement, force modernization, force mobilization, force engagement, and force deployment. EIS integrates existing sources of Army data into a decision making system and incorporates software to aid in the visualization and analysis of the data. (94LAM-001)

Vector Research, Inc., CECOM, Louisiana Maneuvers Task Force

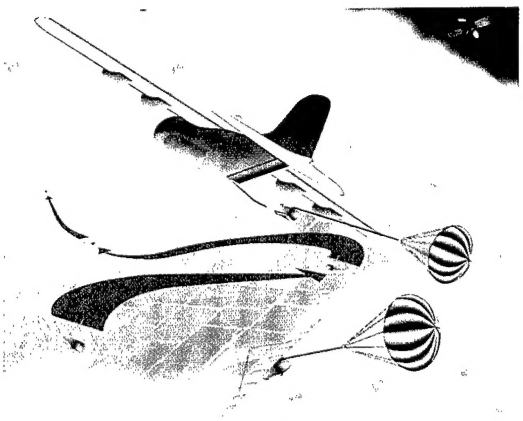
Cypher UAV



A model of the Cypher UAV (including flight characteristics and payload sensor) was developed and integrated into the JANUS simulation (a force-on-force simulation with operator-in-the-loop used to define and evaluate scenarios) at the Dismounted Battlespace Battle Lab. This integrated model was used to evaluate the value of a Cypher UAV in various battle scenarios. A series of flight demonstrations were conducted to validate the simulations and models as well as address the realistic application of the hardware in a field exercise environment. Soldier survivability, lethality, and situation awareness is enhanced by providing timely reconnaissance, surveillance, and targeting imagery. (94DIS-028)

Sikorsky Aircraft, MICOM, Dismounted Battlespace BL

Deployable Wing with Cargo Pod



This effort demonstrated airdrop of a Deployable Wing system from a C-130 aircraft, at altitudes of up to 25,000 feet and offsets of 15 miles, to accuracies within 100 meters of target. With a cargo pod mounted beneath the wing, the Deployable Wing system is capable of a 6:1 glide ratio at speeds from 30 to 70 knots. The wing provides a long stand-off capability which eliminates the need for delivery aircraft to fly over a defended target or to cross sensitive air borders. It also enhances early entry, peacekeeping, and humanitarian relief operations by providing increased accuracy and the capability to service many ground positions from a single, long stand-off release point, reducing the number of aircraft required to support missions.

(94EELS-009)

USBI, United Technologies, NRDEC, Early Entry, Lethality and Survivability BL

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